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Period.	No. of Obs.	*c*	*a* Corrected.	*b* Corrected.
		″	″	″
79	112	+1·64	+3·05	+2·24
80	111	+1·20	−0·41	+4·13
81	122	+0·30	+0·85	+3·46
82	99	−0·40	−1·42	+3·91
83	132	−1·00	−0·96	+0·86
84	105	−2·69	+0·76	−0·56
85	125	−1·04	+0·91	−0·44
86	120	−0·62	+1·10	+2·77
87	136	−2·53	+0·55	+1·90
88	123	−2·91	−0·25	+4·14
89	123	−3·88	−2·72	+3·47

On the Large Sun-spots of 1903 *October* 4–18 *and October* 25–*November* 6, *and the Associated Magnetic Disturbances.*

(*Communicated by the Astronomer Royal.*)

As two striking instances have occurred in less than three weeks of a marked magnetic disturbance simultaneous with the appearance of a great group of spots near the centre of the Sun's disc, some particulars of both phenomena may be of interest, though there has not been time as yet to do more than measure and reduce two or three of the photographs taken of the Sun, and though the record is imperfect until the arrival of photographs from India and Mauritius to supplement the Greenwich series.

The two groups of spots in question were both in the southern hemisphere, and both very nearly in the same latitude. The first to appear was very much the larger, and may be distinguished as the Great Southern Group; whilst the other may be termed the Second or Smaller Southern Group.

The Great Southern Group was first seen on the east limb on October 4, when a regular spot of no great area came into view. The rest of the group was not completely seen until October 5, the above-mentioned leader being separated by nearly 3° of heliographic longitude from the next portion of the group. The entire length of the group as measured on October 9 was more than 17°, and its greatest breadth in heliographic latitude was 6°·7. Its total area on this day was 2080, as expressed in the usual unit—millionths of the Sun's visible hemisphere.

The heliographic latitude of the centre of the principal spot was −21°. The heliographic longitude of the same point was 205°·5. The positions of this point relative to the central meridian of the Sun, at the times when the magnetic disturbance began and ended, and when its most marked phase began and ended, were as follows :—

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Magnetic Disturbance.	Greenwich Civil Time.	Longitude of C.M.	Longitude of Spot from C.M.
	d h	°	°
Disturbance began	Oct. 12 18	188·2	17·3 W.
Most marked phase began ...	12 20	187·1	18·4
Most marked phase ended ...	13 3	183·2	22 3
Disturbance ended	13 4	182·6	22·9

The longitude of the central meridian of the Sun at noon on October 10 was 217°·8; on October 11, 204°·6; on October 12, 191°·5. The leader spot of the group reached the central meridian about October 10^{d} 18^{h}; the centre of the principal spot about October 11^{d} 8^{h}; the last spots of the group passing about October 12^{d} 8^{h}; Greenwich Civil Time being used throughout.

The group underwent great and rapid changes of form; its chief characteristics being the number and complexity of the bright bridges which invaded it. Thus on October 9 a very broad bright bridge entered the principal spot from the west, and stretched out in an undulating line towards the east, almost obliterating the umbra, and dividing the spot itself into two elongated and parallel sections. The after-part of the group was even more completely divided by bright material, crossing it in both the east and west and the north and south directions, so that it formed four distinct spots. By October 12 the group had very greatly changed its appearance; the chief bridge in the principal spot now entering it from the south, and cutting it across its length, and not, as before, in the direction of its length.

The group passed out of view at the west limb on October 17 and 18.

It returned again to the east limb on November 2, as a much broken and extended stream, divided into four distinct sections. Of these the two preceding sections broke up, like an exploding shell, into a great number of small faint spots; and the two following sections coalesced to make one long and nearly continuous stream.

Although October 4 was the first appearance of the group, a short-lived spot marked the place where the great group was afterwards to appear, from September 10 to September 16. This spot, however, closed up and disappeared some days before reaching the west limb.

The Second or Smaller Southern Group appeared on the east limb on October 25. It consisted of a nearly continuous stream, which gradually broke up in its passage across the disc. The leading spot of the group reached the central meridian October 31, 10^{h}, and the entire group, which was about 10° of heliographic longitude in length, had passed by November 1, 4^{h}. The principal spot of the group was in heliographic latitude −20°·0, and longitude 296°·0. The position of its centre relative

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to the central meridian of the Sun at the times when the magnetic disturbance began and ended, and when its most marked phases occurred, were as follows : the longitude of the central meridian at mean noon being 314°·0 on October 30, 300°·8 on October 31, and 287°·7 on November 1.

Magnetic Storm.	Greenwich Civil Time.			Longitude of C.M.	Longitude of Spot from C.M.
	d	h	m	°	°
Disturbance began	Oct. 31	6		304·1	8·1 E
Violent movements began ...		13		300·3	4·3
Most westerly declination ...		15	40	298·8	2·8
Most easterly declination ...		19		297·0	1·0
Violent movements ceased ...		23		294·8	1·2 W.
Disturbance ended	Nov. 1	5		291·5	4·5

The area of the group on October 31 was about 670 ; less than one-third that of the Great Southern Group.

The group as it passed towards the west limb took an arched form, convex to the solar equator, and the following portion of the group gradually closed up.

The group reached the west limb on November 6.

A third group of spots—one in the Northern hemisphere—was seen from October 2 to October 14, and returned to the east limb on October 29. It consisted at its first appearance of a large regular spot, followed by a stream of small spots. On its return it consisted chiefly of a pair of large regular spots. The mean longitude of the group on October 31 was 232° ; its latitude 17½° N. ; its area 698. Its centre passed the central meridian about November 5, 18^h. It reached the west limb on November 11. A recognisable, but quite minor, magnetic disturbance took place on November 5.

The Magnetic Disturbances of 1903 *October* 12–13 *and October* 31–*November* 1.—The disturbance of October 12–13, although not falling within the category of "great" disturbance, presented many interesting and characteristic features. The limit of the disturbance period in the magnetic elements was comprised between October 12^d 18^h and 13^d 4^h, and the amplitude of declination disturbance amounted to 35′. The movements in Earth currents were especially marked between October 12^d 20^h and 13^d 3^h. The magnetic changes in this disturbance were of a bolder and more active character than those recorded in any similar disturbance during the preceding five years.

The disturbance of October 31–November 1 was of a far more important type. Commencing with characteristic suddenness at October 31^d 6^h, it speedily developed a phenomenal degree of activity, and from October 31^d 13^h to 23^h the movements of all the magnets were extremely violent ; changes exceeding one degree in arc in declination being frequently shown

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in very short periods of time. The spots of light of the horizontal force and vertical force magnets passed beyond the range of the recording barrels for many hours during the afternoon and evening, and for shorter periods at other parts of the day, but little loss will be incurred on this account, as eye observations were made in great detail. Active disturbance ceased about November 1^d 5^h, the movements gradually subsiding after midnight. The declination magnet reached its extreme westerly position at October 31^d 15^h 40^m and its most easterly position at 31^d 19^h, the extent of change exceeding 2°.

This disturbance is greater than any recorded at the Royal Observatory since the great disturbance of 1882 November 17, which it closely resembled in many respects.

Royal Observatory, Greenwich :
1903 *November* 12.

Observations of Mars in 1903. By the Rev. T. E. R. Phillips, M.A.

The planet *Mars* was in opposition on 1903 March 28. His maximum diameter scarcely reached 14″·6, but the apparition was nevertheless a very favourable one for an examination of the planet's N. hemisphere. The latitude of the centre of the disc was +22°·6 at the time of opposition, and increased to over 25° by the middle of May. The weather, too, was on the whole very propitious, and the seeing conditions, despite some bad periods, frequently excellent. Between the middle of February and the end of May I was able to observe the planet on no fewer than sixty-six occasions. Thirty-two whole-disc drawings were made, besides drawings of special features. The instrument employed was a 9¼-inch silvered-glass reflector (mirror by With), with powers between 217 and 450.

The following is a description of the results obtained, the letters and numbers referring to the accompanying chart:—

The Maria.—The boundaries of the *Maria* were very well defined, and, in some cases, bordered by bright regions. As usual the *Maria* were by no means uniform in depth of tone, lighter and darker patches being frequently seen. The *Syrtis Major* (H) especially contained brighter areas—*Œnotria* (α'), *Iapygia* (β)—in its S. portion, but was very dark towards its N. extremity. The *Syrtis Minor* (G), *Sinus Sabœus* (I), *Margaritifer Sinus* (A), *Auroræ Sinus* (D), *Mare Acidalium* (B), and *Baltia* (C) were all noted as dark. *Mare Sirenum* (E), doubtless in consequence of its proximity to the limb, appeared less dark than usual. *Atlantis* separating it from *Mare Cimmerium* (F) was not